



November 2016

**CONDITIONAL USE LEVEL DESIGNATION FOR BASIC (TSS) AND
DISSOLVED METALS (ENHANCED) TREATMENT**

For

**CONTECH Engineered Solutions
Stormwater Management StormFilter®
with MetalRx™ media**

Ecology's Decision:

Based on Contech Engineered Solutions application, Ecology hereby issues conditional use level designation (CULD) for the Stormwater Management StormFilter® using MetalRx™ media cartridges:

1. Conditional Use Level Designation (CULD) for Basic Treatment (total suspended solids) and for Dissolved Metals ("Enhanced") treatment.
 - Sized at a hydraulic loading rate of no greater than 1 gallon per minute (gpm) per square foot (sq ft.) of media surface, per Table 1.
 - Using Contech's MetalRx media. Specifications for the media shall match the specifications provided by the manufacturer and approved by Ecology.

**Table 1. StormFilter design flow rates for 18-inch
diameter cartridges with MetalRx media, operating at 1
gpm/sq ft.**

| Effective cartridge height (in) | Cartridge flow rate (gpm/cartridge) |
|----------------------------------------|------------------------------------------------|
| 12 | 5 |
| 18 | 7.5 |
| 27 | 11.25 |

2. Ecology approves StormFilter systems containing MetalRx media for treatment at the hydraulic loading rates shown in Table 1, to achieve the maximum water quality design flow rate. The water quality design flow rates are calculated using the following procedures:

- **Western Washington:** For treatment installed upstream of detention or retention, the water quality design flow rate is the peak 15-minute flow rate as calculated using the latest version of the Western Washington Hydrology Model or other Ecology-approved continuous runoff model.
- **Eastern Washington:** For treatment installed upstream of detention or retention, the water quality design flow rate is the peak 15-minute flow rate as calculated using one of the three methods described in Chapter 2.2.5 of the Stormwater Management Manual for Eastern Washington (SWMMEW) or local manual.
- **Entire State:** For treatment installed downstream of detention, the water quality design flow rate is the full 2-year release rate of the detention facility.

3. The use level designation expires on June 30, 2016 unless Ecology extends the date, and is subject to the conditions specified below.

Ecology's Conditions of Use:

StormFilter systems containing MetalRx media shall comply with the following conditions:

1. Design, assemble, install, operate, and maintain StormFilter systems containing MetalRx media in accordance with applicable Contech Engineered Solutions manuals, documents and the Ecology Decision.
2. Use sediment-loading capacity, in conjunction with the water quality design flow rate, to determine the target maintenance interval.
3. Install StormFilter systems in such a manner that you bypass flows exceeding the water quality treatment rate or you will not re-suspend captured sediments.
4. Contech Engineered Solutions commits to submitting a QAPP for Ecology review and approval by October 1, 2014 that meets the TAPE requirements for attaining a GULD for basic and dissolved metals treatment.
5. Contech Engineered Solutions shall complete all required testing and submit a TER for Ecology review by January 1, 2016.
6. Contech Engineered Solutions may request Ecology to grant deadline or expiration date extensions, upon showing cause for such extensions.
7. This CULD approval allows up to ten (10) installations of StormFilter systems containing MetalRx media within the State of Washington for development and redevelopment projects (as defined by the Stormwater Management Manual Western Washington). The limit of ten sites applies to the total number of installations; whether for basic or for dissolved metals (enhanced) treatment.
8. **Maintenance:** The required maintenance interval for stormwater treatment devices is often dependent upon the degree of pollutant loading from a particular drainage basin. Therefore, Ecology does not endorse or recommend a "one size fits all" maintenance cycle for a particular model/size of manufactured filter treatment device
 - Typically, CONTECH designs StormFilter systems for a target filter media replacement interval of 12 months. Maintenance includes removing accumulated sediment from the vault, and replacing spent cartridges with recharged cartridges.

- Indications of the need for maintenance included the effluent flow decreasing to below the design flow rate, as indicated by the scumline above the shoulder of the cartridge.
 - Owners/operators must inspect StormFilter with MetalRx for a minimum of twelve months from the start of post-construction operation to determine site-specific maintenance schedules and requirements. You must conduct inspections monthly during the wet season, and every other month during the dry season. (According to the SWMMWW, the wet season in western Washington is October 1 to April 30. According to SWMMEW, the wet season in eastern Washington is October 1 to June 30). After the first year of operation, owners/operators must conduct inspections based on the findings during the first year of inspections.
 - Conduct inspections by qualified personnel, follow manufacturer's guidelines, and you must use methods capable of determining either a decrease in treated effluent flowrate and/or a decrease in pollutant removal ability.
 - When inspections are performed, the following findings typically serve as maintenance triggers:
 - Accumulated vault sediment depths exceed an average of 2 inches, or
 - Accumulated sediment depths on the tops of the cartridges exceed an average of 0.5 inches, or
 - Standing water remains in the vault between rain events, or
 - Bypass during storms smaller than the design storm.
 - Note: If excessive floatables (trash and debris) are present, perform a minor maintenance consisting of gross solids removal, not cartridge replacement.
9. Discharges from the StormFilter systems containing MetalRx media shall not cause or contribute to water quality standards violations in receiving waters.

Applicant: CONTECH Engineered Solutions

Applicant's Address: 11835 NE Glenn Widing Dr.
Portland, OR 97220

Application Documents:

- August 27, 2012 letter from CONTECH Engineered Solutions requesting a CULD from Washington State Department of Ecology.
- Application and supporting documentation. Stormwater Management StormFilter[®] MetalRx[™] at a Specific Flow Rate of 1 gpm/ft².

- Volume 1 – Technology Description
 - Appendix A – Specifications
 - Appendix B – Schematics
 - Appendix C – Operations & Maintenance
- Volume 2 - MetalRx™ at 1 gpm/ft²
 - Lab testing
 - Field Testing
 - Appendix A – Site Report
 - Appendix B – Statistics
 - QAPP

Applicant's Use Level Request:

- General use level designation as a basic (TSS) and dissolved metals treatment device in accordance with Ecology's 2012 Stormwater Management Manual for Western Washington and Technology Assessment Protocol – Ecology (TAPE January 2011 Revision).

Applicant's Performance Claims:

Based on results from laboratory and field-testing, the applicant claims:

- The Stormwater Management StormFilter with MetalRx media operating at 1 gpm/ft² removes greater than 80% suspended solids for influent concentrations greater than 100 mg/L, 60% dissolved zinc for influent concentrations greater than 20 ug/L, and 30% dissolved copper for influent concentrations greater than 5 ug/L.

Recommendations:

Ecology finds that:

- CONTECH Engineered Solutions qualifies for the opportunity to demonstrate, through field-testing in the Pacific Northwest, whether the StormFilter system with MetalRx media can attain Ecology's basic and dissolved metals treatment goals.

Findings of Fact:

Laboratory testing

- Since 1992, CSF® leaf, XFCSF™, and MetalRx media have been widely tested to investigate their pollutant removal capabilities for stormwater.
- In one laboratory study, Stormwater Management tested a single cartridge with XFCSF media for TSS, copper, and zinc removal using synthetic stormwater. Test flow rate was 6.5 gpm (slightly lower than the 7.5 gpm that corresponds to a loading of 1 gpm/ft²). Contech made synthetic stormwater using zinc and copper salts and sandy loam (USDA) or sandy organic (USCS) sediment. Eight (8) of 14 test runs had TSS concentrations within the TAPE assessment range. These influent TSS concentrations ranged from 22 to 68 mg/L, and TSS removal was between 89 and 95 percent. Two (2) of 14 test runs had influent dissolved zinc in the TAPE assessment range, with a removal of 78-80 percent (influent concentrations 0.155, 0.185 mg/L). The remaining twelve (12) runs had much higher dissolved zinc influent concentrations, with removals ranging from 93 to 98

percent. The influent dissolved copper concentrations for all runs were higher than the TAPE assessment range of 0.005 to 0.02 mg/L. Influent dissolved copper ranged from 0.024 mg/L to 17.0 mg/L. Dissolved copper removal ranged from 15 to 97 percent (average of 65 percent).

Field testing

- Contech conducted monitoring of a StormFilter system using a blend of perlite and MetalRx media treating runoff from a 2.3-acre parking lot. Influent TSS concentration ranged from 22 to 71 mg/L. Discrete TSS removal efficiency ranged from 68 to 78 percent (5 storm events). Removal efficiency for influent dissolved zinc in the range of 19 to 60 ug/L ranged from 41 to 77 percent, with an average of 63 percent (6 storm events). Dissolved copper removal for a single event was 22 percent (influent 3.33 ug/L; effluent 2.59 ug/L).
- Contech conducted monitoring of a large-scale StormFilter system using MetalRx media treating runoff from 152 acres of airport runoff (roads, parking lots, roofs, taxiways, landscaping). The StormFilter system is downstream of a detention pond; therefore; influent TSS concentrations for all monitored events were lower than the lower end of the TAPE assessment range (<20 mg/L). Dissolved zinc removal ranged from 47 to 80 percent for influent concentrations from 30 to 52 ug/L. Average dissolved zinc removal was 68 percent (11 events). Dissolved copper removal ranged from -3 to 50 percent for influent concentrations from 7.7 to 18 ug/L. Average dissolved copper removal was 32.3 percent (11 events).
- Contech conducted monitoring of a StormFilter system using XFCSF media treating runoff from a 1-acre galvanized metal roof. The XFCSF media is similar to MetalRx media, except that XFCSF media comprises slightly larger gradation of media pellets. Contech did not monitor TSS removal for this study. Influent dissolved zinc concentrations were all higher than the upper end of the TAPE assessment range (> 300 ug/L), and ranged from 389 to 11,600 ug/L. Dissolved zinc removal ranged from 25 to 90 percent, with an average removal of 64 percent (12 events). Influent dissolved copper ranged from 2.1 to 18.2 ug/L. Dissolved copper removal ranged from 27 to 76 percent, with an average removal of 55 percent.

Other StormFilter system MetalRx media matters to be addressed by the company:

1. Test the system under normal operating conditions, such that pollutants partially fill the settling basin. Results obtained for “clean” systems may not be representative of typical performance.
2. Conduct field-testing at sites that are indicative of the treatment goals.
3. Conduct testing to obtain information about maintenance requirements in order to come up with a maintenance cycle.
4. Conduct loading tests on the filter to determine maximum treatment life of the system.

Technology Description: Download at: <http://www.conteches.com/Products/Stormwater-Management/Treatment/Stormwater-Management-StormFilter.aspx>

Contact Information:

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Applicant website: www.conteches.com

Ecology web link: <http://www.ecy.wa.gov/programs/wq/stormwater/newtech/index.html>

Ecology: Douglas C. Howie, P.E.
Water Quality Program
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Revision History

| Date | Revision |
|------------------|------------------------------------------------------------------------------------------------|
| November 7, 2012 | Original Draft use-level-designation document: CULD for basic and dissolved metals (enhanced). |
| November 2016 | Revised Contech contact information |
| | |

Attachments

August 27, 2012 letter from Contech Engineered Solutions.

August 27, 2012

Doug Howie
Water Quality Section
Washington State Department of Ecology
300 Desmond Drive
Lacey, WA 98503

Subject: Stormwater Management StormFilter® with MetalRx™ Request for CULD

Dear Mr. Howie,

CONTECH would like to request a Conditional Use Level Designation (CULD) for the Stormwater Management StormFilter® (StormFilter) with MetalRx™ media operating at a specific flow rate of 1.0 gpm/ft². Ecology indicated in a May 9, 2012 letter entitled "TAPE 2011 Submittal for Contech StormFilter with MetalRx media (1gpm/ft²)" that it would consider the application for a CULD provided that Contech commit to monitor. Contech will commit to finding a site that can satisfy Ecology's dissolved metals concentrations and providing a Quality Assurance Project Plan (per TAPE 2011) to Ecology within 2 years of issuing a CULD.

Sincerely,



Sean Darcy
Regional Regulatory Manager
CONTECH Engineered Solutions